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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 08/977,374
Filing Date: November 24, 1997
Appellant(s): BAKKER, WILLIAM J.

08/977,374
Thomas E. Kocovsky, Jr.
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 17 December 2004 appealing from the office action mailed May 18, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings, which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

The examiner notes that the appeal referred to by appellant in the brief filed on 17 December 2004 as being in a parent case, is in the instant case, the appeal was withdrawn by action of the filing of an RCE on September 12, 2002.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

The examiner notes that final rejection mailed May 18, 2004 contained obviousness type double patenting rejections over two different related patents (U.S. 5,993,942 and 6,291,037). Appellant filed terminal disclaimers on 12 April 2005 in response to a Notice of a Defective Brief mailed March 7, 2005. The terminal disclaimers have been accepted. The obviousness type double patenting rejections have been overcome and are withdrawn as a result of the acceptance of the terminal disclaimers.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

5,113,479	Anderson et al.	5-1992
3,955,699	Amberg et al.	11-1976

Patent Specification 27,337/67 Commonwealth of Australia, Heilman et al., published 27th March 1969 (filed with the IDS of Nov. 6, 1998, copy also submitted to be scanned into IFW with the instant examiner's answer).

Admission in the amendment filed in the instant application February 17, 2004, at page 13 last paragraph, to page 14, second paragraph (in IFW as a declaration filed Dec. 17, 2004 with the instant brief as well as under the date actually filed).

Admission in the reply brief filed in the instant application August 24, 2000 at page 2, sixth paragraph, beginning "Once again" (in IFW in the evidence appendix of the instant brief as well as under the date actually filed).

Admission in the supplemental appeal brief in the instant case, filed May 12, 2000 at pages 5 and 6 (in IFW in the evidence appendix of the instant brief as well as under the date actually filed).

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

A) Claims 36, 37, 38 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heilman et al. (Australia 27,337) in view of Amberg et al. (U.S. 3,955,699) further in view of applicant's admissions in the amendment filed 17 February 2004 at page 13, last paragraph to page 14, second paragraph, in the reply brief filed 24 August 2000, page 2, 6th paragraph beginning "Once again", and in the supplemental appeal brief filed 12 May 2000 at pages 5 and 6).

Heilman et al. teach a film which extends over the rim of a container and is heat shrunk onto the container by applying energy which may be in the form of indirect infrared radiation to the edge first, in order to contract the film edge onto the rim of the container and form a seal. The top is shielded while the rim is shrunk, and as an option the top is then heated in order to contract and further tighten the film (page 10). The film may be transparent (page 3). The film of Heilman et al. being transparent, remains unchanged when exposed directly to infrared radiation, and is instead responsive to the heat

generated by the infrared radiation when it strikes parts, of the oven or the container, that absorb the radiation and are heated (see applicant's arguments in the amendment, and briefs noted above). The examiner takes the above noted arguments by applicant as an admission that the film substrate of Heilman et al. remains unchanged upon exposure to radiant energy as is instantly claimed. Amberg et al. teach using an opaque material made of an elongate blank or strip of a thermoplastic material to form a skirt on a lid edge that shrinks and forms a tight fit and seal with the container edge when the opaque plastic material is directly heated by infrared radiation. Using direct infrared radiation with an opaque material is taught as being advantageous because only a few IR lamps are needed for this direct exposure (col. 4, lines 45-50).

The instant invention claims a means included on the downwardly extending portion of a film lid, that coverts radiant energy to heat, which in turn shrinks the downward edge portion of the film onto the rim of a container, to form a spill resistant cover on the container. As a matter of claim construction "the extending portion including a first means to convert the radiant energy to heat" is taken as the extending portion being a tinted material or having an energy absorbing

coating, which may be colored and formed by printing (page 12, line 35 to page 13, line 25 of the instant specification) and their structural equivalents.

It would have been obvious to one of ordinary skill in the art to join an opaque heat shrinkable thermoplastic material to the downwardly extending edge portion of Heilman et al. or make the downwardly extending edge portion of an opaque heat shrinkable thermoplastic material in order to directly absorb infrared radiation and use only a limited number of lamps because of the teachings of Amberg et al. Regarding claim 41, use of film in a roll to make lids is taught by Heilman et al. (see Figures 3 and 7). Regarding claim 38, the examiner takes the opaque portion of Heilman et al. in view of Amberg et al. and applicant's admissions, as having a tint or difference in color from the transparent central portion of the film.

B) Claims 39-40, 42-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heilman et al. (Australia 27,337) in view of Amberg et al. (U.S. 3,955,699) further in view of applicant's admissions in the amendment filed 17 February 2004 at page 13, last paragraph to page 14, second paragraph, in the reply brief filed 24 August 2000, page 2, 6th paragraph

beginning "Once again", and in the supplemental appeal brief filed 12 May 2000 at pages 5 and 6) as applied to claims 36, 37, 38 and 41 above, and further in view of Anderson et al. (U.S. 5,113,479).

Anderson et al. teach the use of a dark color strip formed by printing on a portion of a thermoplastic film laminated to a cardboard or paper central layer, that is to be heated by direct IR radiation till it softens so that it may be joined to a second thermoplastic film folded over the edge of the central layer (col. 3, lines 1-15). The dark color printed strip enhances the absorption of the IR radiation in order to reduce power consumption during the heating step (col. 3, lines 10-15). The instant invention claims the use of an opaque portion formed on the downwardly extending portion of a film lid by printing with an ink coating that absorbs IR radiation. It further would have been obvious make the downwardly extending portion of the film of Heilman et al. (Australia 27,337) in view of Amberg et al. (U.S. 3,955,699) further in view of applicant's admissions as noted above, better able to absorb IR radiation by the use of dark printing ink in order to reduce energy consumption because of the teachings of Anderson et al.

(10) Response to Argument

A) Response to Appellant's argument at Section VII. A. 1, starting at page 3 of the Brief.

Appellant argues that Heilman et al. does not teach a film that has an edge modification that is different from the bulk of the film. The examiner does not argue that Heilman et al. supplies this limitation, but instead relies upon the Amberg et al. reference for this teaching. Appellant also argues that the shield of Heilman et al. which covers the top of the film lid to prevent it from shrinking while the edge is being shrunk, teaches away from modification of the edge to have radiation absorbing properties as claimed. The examiner disagrees with this argument. Heilman et al. at the bottom of the 3rd paragraph of page 10, explicitly states that, if desired, only the skirt or edge of the film lid needs to be exposed to heat and shrunk. The examiner does not see how teaching that only one part need be heated teaches away from modification of that part to enhance the ability of the part to be shrunk.

Appellant also argues that Heilman et al. does not meet the instant limitation of the lid film being made of a material that remains unchanged when exposed to radiation except for the modification of the edge portion. The examiner disagrees. The

third paragraph of page 3 of Heilman et al. calls for the film to preferably be transparent. The 17 February 2004 amendment in the instant case (relied upon in the rejection) at page 13 last paragraph to page 14, second paragraph states that the transparent film of Heilman et al. typically will not absorb infrared radiation so as to produce heat energy. "If Heilman were using infrared radiation, no shield would be necessary to protect the top from exposure because the transparent film would not shrink upon exposure to infrared radiation" (2nd paragraph, page 14). "Once again, as adamantly emphasized in the Appeal Brief, Appellants would like to point out that infrared radiation applied to transparent film, by itself, will pass directly through the film. No shrinkage will occur without the claim designated modification to the film." (Reply Brief filed 24 August 2000, at page 2, 6th paragraph beginning "Once again", relied upon in the rejection). "However, a transparent film, alone, will pass infrared energy right through without transforming the radiant energy into heat energy." (page 6, first paragraph of the Supplemental Brief filed 12 May 2000 relied upon in the rejection).

Appellant in the instant brief quotes a passage from page 3 of the 17 February 2004 amendment which addresses the specific

passage in Heilman et al. relied upon by the examiner and states that from that passage it is unclear if the film of Heilman et al. remains unchanged when exposed to IR radiation and thus Heilman et al. does not meet the instant limitation of a film that remains unchanged when exposed to radiation. As appellant has made contrary arguments in the same paper and in papers filed before the 17 February 2004 amendment, as noted above, the position of the examiner is that appellant should be bound by his repeated arguments that Heilman et al. teaches a transparent film and that such a film remains unchanged by exposure to IR radiation.

Regarding Amberg et al. appellant argues that Amberg et al. teaches different materials for the lid top and edges and that Amberg et al. does not teach the top of the lid being heat shrinkable. The examiner does not rely on Amberg et al. for a teaching of a single film material that is heat shrinkable. The rejection relies upon Heilman et al. for this limitation. The examiner relies upon Amberg et al. for the teaching of making the edge portion of the lid opaque in order to directly absorb infrared radiation in order to shrink and form a seal with the container.

B) Response to Appellant's argument at Section VII. A. 1. a, starting at page 6 of the Brief.

Appellant argues that the combination of Heilman et al. and Amberg et al. does not result in a film shaped and sized to have a downwardly extending portion. Appellant argues that one of ordinary skill in the art would only be motivated to take a strip of heat shrinkable opaque film, form it into a band and then attach it to the edge portions of the film of Heilman et al. thus resulting in a three dimensional structure that is not a film. The examiner does not see why one of ordinary skill in the art seeking to transfer the teaching from Amberg et al. of using an opaque material on the edge portion that is to be shrunk by radiation, would seek to bodily incorporate the edge structure of Amberg et al. onto the existing edge portion of the film of Heilman et al. resulting in two different edge portion structures instead of simply making the existing film edge portion of Heilman et al. opaque through use of an opaque film material. One does not have to be able to bodily incorporate the features of a secondary reference in order to transfer the teachings of that reference (MPEP 2145 III).

C) Response to Appellant's argument at Section VII. A. 1. b, starting at page 6 of the Brief.

Appellant argues that the film skirt of Amberg et al. deforms when heated by contact with a heated mandrel and that it does shrink when irradiated with IR radiation and thus cannot meet the instant claim language of a film which does not change when exposed to radiation with a means that allows absorption of radiation. The opaque nature of the film of Amberg et al. is a means to allow absorption of IR radiation and thus the performance of the film skirt of Amberg et al. is consistent with appellant's claim language. The fact that the film of Amberg et al. can be deformed by direct heating, is irrelevant to the instant claim language.

D) Response to Appellant's argument at Section VII. A. 1. c. starting at page 6 of the Brief.

Appellant argues that the function of Heilman et al. is destroyed because of the physical incorporation of a separate skirt on the film of Heilman et al. As noted above the combination of the references does not require direct bodily incorporation of the skirt of Amberg et al. Appellant also argues that applying radiation only to the edge portion of

Heilman et al. teaches away form shrinking the top portion of Heilman et al. As noted above, heating the top portion of Heilman et al. is optional in Heilman et al. Thus deletion of this step does not destroy the function of the reference. Appellant also argues that there is no way to function without the shield of Heilman et al. The combination of the references does not require deletion of the shield from Heilman et al. only direct IR application to the edge portions of Heilman.

E) Response to Appellant's argument at Section VII. A. 1. d, starting at page 7 of the Brief.

Appellant argues that there is no motivation to combine because there would be both an infrared step on the edges and a direct heating step on the top of Heilman et al. As noted above, shrinking the top is optional in Heilman et al. The examiner does not require that the entire film of Heilman et al. to be made of the opaque material of Amberg et al. The rejection only requires that the edge portions be made opaque as taught by Amberg et al. to allow the use of IR lights directed only at the edge portions that need to be shrunk.

F) Response to Appellant's argument at Section VII. A. 2, starting at page 8 of the Brief.

Appellant argues that Anderson at al. teaches directing IR radiation only to an area that is not on the edge of the material and that the heating does not cause shrinking of the film of Anderson et al. and that therefore the reference would not be combined with the combination of Heilman et al. in view of Amberg et al. that requires edge heating. The examiner disagrees that one of ordinary skill in the art would be distracted from applying the general teaching of Anderson et al., to apply a black coating strip to an area that need to be heated by IR radiation, simply because Anderson et al. teaches heating of a different area. The base references clearly provide motivation to heat the edges of the lid and provide an opaque film material to help with this heating. Anderson et al. is only relied upon for a specific means of a black coating to accomplish the objective of an opaque edge area required by the combination of Heilman et al. in view of Amberg.

G) Response to Appellant's argument at Section VII. A. 2. a, starting at page 9 of the Brief.

Appellant argues that Anderson et al. does not cure the problem of the lack of teaching of a film that does not respond to IR light in the combination of Heilman et al. in view of Amberg et al. As noted above, the position of the examiner is that Heilman et al. in view of appellant's previous arguments as noted above supplies this limitation.

H) Response to Appellant's argument at Section VII. A. 2. b, starting at page 9 of the Brief.

Appellant again argues that Anderson et al. in combination would not suggest an absorbent coating on an edge portion. This argument has already been addressed above.

I) Response to Appellant's argument at Section VII. A. 2. c, starting at page 10 of the Brief.

Appellant argues that Anderson et al. does not teach a substrate that remains unchanged when exposed to IR light. As noted above Heilman et al. in view of appellant's previous arguments as noted above.

J) Response to Appellant's argument at Section VII. A. 2. d, starting at page 10 of the Brief.

Appellant argues that Anderson et al. is non-analogous art because it is not directed to shrink wrap packaging material. The examiner disagrees in that Anderson et al. is directed to packaging and specifically mentions the use of IR radiation to form lids as prior art (column 1, lines 15-25). Anderson et al. is also directed to the common problem of the use of IR radiation to heat plastic materials.

K) Response to Appellant's argument at Section VII. A. 2. e, starting at page 10 of the Brief.

Appellant argues that Anderson et al. teaches away from combination with Heilman et al. because such a combination would only require heating of the edge portions and not the top portion. As noted above heating the top of Heilman et al. is optional in Heilman et al.

L) Response to Appellant's argument at Section VII. A. 2. f, starting at page 11 of the Brief.

Appellant argues that is it not clear how the teachings of Anderson et al. would be incorporated into the opaque skirt of Amberg et al. fused to the film of Heilman et al. to form a three dimensional structure. As noted above, the rejection does

not call for the bodily incorporation of the opaque preformed skirt of Amberg et al. into the film of Heilman et al. but only that the edge portions of the film of Heilman et al. be made opaque. Anderson et al. teach a specific way of doing this by coating or printing a black coating on the film as required by instant claims 39 and 40.

M) Response to Appellant's argument at Section VII. A. 3. a, starting at page 11 of the Brief.

Appellant argues that the instant claimed roll of heat shrinkable film is taught away from by the combination with Amberg et al. that requires a three dimensional structure according to appellant's argument. As noted above, the position of the examiner is that the combination of the references only requires that that the lid edge portions of the film Heilman et al. are required to be made opaque, not that the preformed skirt of Amberg be bodily incorporated into Heilman et al.

N) Response to Appellant's argument at Section VII. A. 4, starting at page 12 of the Brief.

Appellant again argues that Anderson et al. cannot be combined with Heilman et al. in view of Amberg et al. because

Anderson et al. teaches directing heat to a non-edge area. As noted above the examiner does not believe that one of ordinary skill in the art could not transfer the general teaching of Anderson et al. to the specific heating problem required by Heilman et al. in view of Amberg et al.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

William P. Watkins III

WILLIAM P. WATKINS III
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COMMONWEALTH OF AUSTRALIA

PATENT SPECIFICATION (21) 27,337/67

Class (52) 57.41; 57.5.

Int. Cl. (51) B65b.

Application Number (21) 27337/67.

Lodged (22) 18th September, 1967.

Complete Specification entitled (54) APPARATUS AND METHOD FOR SIMULTANEOUSLY MAKING CLOSURES AND SEALING CONTAINERS.

Lodged (23) 18th September, 1967.

Accepted (44) Lapsed under Section 47c(b).

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Convention Priority (30)

Applicant (71) JAMES M. HEILMAN and PAUL R. HOFMANN.

Actual Inventor (72) MARTIN MAX STERNAU.

Related Art (56)

The following statement is a full description of this invention, including the best method of performing it known to us:

F. C. Atkinson, Government Printer, Canberra

This application involves the principle of selective, i.e., controlled, shrinkage. It is based on the following principle: When a piece of heat shrinkable, oriented plastic film is subjected to heat of any type, it will shrink and shrivel into an irregular ball-shaped configuration due to its inherent oriented characteristics. However, when the central or interior portion of the film is shielded or otherwise insulated from the direct or indirect influence of heat while the perimeter or rim area is subjected to heat, only the rim area of the film will shrink and will be reduced, thereby being curled and producing a cap-shaped or cup-shaped configuration with an elastic edge.

In the presence of a container, i.e., bottle, can, tray, tub or cup, the film being larger than the mouth of the container and having been placed upon the mouth of the container, and retained thereon and shielded in the area of the mouth of the container, only the exposed edges or rim will shrink causing the edges of the film to curl. The edges will continue to shrink until the curled edge portion of the film is physically restrained by the rim of the container, whereby to form a cap-shaped closure or cover with an expansible or elastic bead or band upon the container. This closure will tightly conform to the mouth of the container regardless of its shape since the film will always assume the configuration of the container mouth, be it round, oval, rectangular, or any other shape. If heat (optional) is thereafter applied to the center portion of the film which previously had been shielded and restrained, that is, the portion within the area defined by the rim of the container, this central area will then shrink and become tight whereby the cap or cover originally formed will form a still tighter hermetical seal around the container.

In view of the above statements, it follows that one of the objects of this invention is to provide an apparatus, and a method, for performing selective shrinkage of a draped or unformed piece of heat shrinkable, oriented plastic film or sheet to form a closure directly upon a container and simultaneously seal the container.

Another of the objects of this invention is to provide an apparatus, machine, or device for performing the method of selective shrinkage of heat shrinkable, oriented plastic film to form a closure directly upon a container and simultaneously to seal the container, i.e., the forming and sealing occurring at the identical instant, said apparatus having means for cutting a piece of film, means for placing said film on top of the mouth of a filled container, means for applying heat, selectively, to the rim area of the film, means for shielding the center portion of the film while heat is applied to its peripheral area, means for thereafter applying heat to the center portion of the film, and transporting means for the filled container before and after sealing.

A further object of this invention is to provide a closure formed by a machine, and a method, using a transparent (preferably), heat shrinkable, oriented plastic film or sheet, which film is thin, fragile, flexible, limp, drapable (preferably), unformed plastic of any type. Heat shrinkable films that are normally less than .002" thick and capable of large shrinkage in all directions parallel to the film surfaces are particularly applicable. Actually films in the range of .0002" (20 gauge) to .0008" (80 gauge) are generally satisfactory and may be used. The thickness of the film, of course, will depend somewhat upon the area to be covered. However, it is within the scope of my invention to use any type film that is shrinkable in only one direction as well as in two directions (e.g. an

oriented film of the so-called tensilized or cross-tensilized type) which could be used on containers of any particular form, such as on a circular or rectangular container.

Typical examples of certain films which could be used are oriented films of rubber hydrochloride (oriented "Pliofilm"[1], such as "Snug-Pak"[2]) or of vinylidene chloride (oriented "Saran"[3], "Cryovac"[4]), biaxially oriented irradiated polyethylene, biaxially oriented polypropylene, heat shrinkable nylon, heat shrinkable polyester ("Mylar"[5]), etc., and including any high shrink energy materials or polymers, which are heat shrinkable by reason of their oriented internal structure commonly induced by stretching the same unidirectionally or multidirectionally while heated or supercooled. Obviously, the "orienting" of such films may be done by mechanical, pneumatic, or other physical methods of expanding or stretching the films, or by chemical, irradiating or other means of crosslinking the molecular arrangement.

The selection of films of suitable shrinkability, suitable shrinkage temperature, and suitable strength will be dictated primarily by the nature of the container or contents, and the temperature to which the localized area may be heated when the sealing of the closure to the container is effected, and such selection may be readily made. For a more extended disclosure of the type film and conditions used herein, reference is made to the above prior heat shrinkable film art.

With the foregoing and other objects in view as will appear from a reading of the following specification and claims, the invention resides in the novel arrangement and combination of parts and in the details of construction and process of manufacture herein described and claimed, it being understood that changes in the precise embodiment of the invention may be made within the scope of what is claimed without departing

*(See page 16 for above registered trademark owners).

from the spirit of the invention. It will be further understood that the invention is susceptible of embodiment in many and various forms, some of which are illustrated in the accompanying drawing, and that the structural details of the apparatus or particular steps of the method herein set forth may be varied to suit particular purposes and still remain within the inventive concept.

Referring broadly to the figures:

Fig. 1 is a diagrammatic side elevation of the complete capping and sealing apparatus.

Fig. 2 is a cross-sectional view taken on the line 2-2 of Fig. 1, while Fig. 2-A is an enlarged view showing the container elevating area.

Fig. 3 is a diagrammatic view of the film positioning device showing the motion of the pick-up fingers or suction cups for transporting the film on top of the film shelf, with the conventional actuating means omitted for clarity.

Fig. 4 is substantially a plan view of Fig. 3 illustrating schematically the movement of the pick-up fingers, but also with actuating elements omitted.

Fig. 5 is a cross-sectional view taken on the line 5-5 generally illustrating the container elevating and film heating means.

Fig. 6 is an enlarged detail view of a preferred fluid heat sealing means taken on the line 6-6 of Fig. 5, and Fig. 6-A illustrates the details of the container platform, the container being reduced in size to better illustrate the configuration of the platform.

Fig. 7 illustrates a further modified form wherein a roll of pre-perforated film is used with a clamping or holding bar for tearing the individual cover strips at a film severing station.

Referring in detail to Fig. 1, numeral 1 indicates the housing or frame for the apparatus containing motor 2, reduction gears 3, a train of gears generally indicated by 4, and a power shaft 5 on which are mounted a series of cams and eccentrics indicated by numerals 6, 6a, 6b, 6c.

As illustrated in Fig. 1, a roll of film 7 is mounted on the housing 1 by support 8 which also holds feed rollers 9 through which film 10 passes as it is moved (see also Figs. 3 and 4) over the upper film shelf 11 supported by brackets 12. A lower container shelf 13, positioned by lower brackets 14, carries an intermittently movable belt 15, with spaced holes therein, to move the filled containers towards the capping station by a stepwise movement. This occurs after the containers have been brought by conventional means from the filling machine to the movable belt 15. Obviously, the holes in the belt, and belt shelf must be large enough to permit the passage of elongated platform 22, but small enough so that the bottom of the container will not fall through (see Fig. 6A). The tension in the container carrying belt 15 may be adjusted by standard regulating and tensioning means 17a. Instead of using a single belt with spaced apertures, two narrow, spaced apart, belts may be used on belt shelf 13. Here again the spacing must be small enough to prevent the bottom of the containers from falling through, but large enough to permit free passage of platform 22.

Power shaft 5, through an eccentric 6-a (see Fig. 1) reciprocates rod 17, actuating a ratchet 18, to move intermittently the container belt or cup transfer belt 15 in a forward direction. If desired, a positive chain drive 15a may be used between the belt power drum, operated through rod 17 and ratchet 18, and the belt idler drum. Similarly, rod 19 (see Fig. 3) actuated by cam 19a and cam fork 19b moves ratchet 20 on feed rolls 9 to advance the film 10. Cam 19a is driven

by bevel gear drive 19c, shown in Fig. 2.

Timed with this movement is the reciprocating movement of elevator shaft 21 through stationary bearing 23 carrying the narrow elongated platform 22 with its base hub and oppositely arranged upstanding ears preferably of equal size. Movement of the platform 22 is produced by cam 6 and cam fork 21a. The platform supports a container to be capped. The diameter, or the length, of the bottom of a container, must be larger than a portion of the preferably rectangular aperture in the container transfer belt, as can be seen in Figs. 2 and 2-A, while both the longer and narrower dimensions of the preferably rectangular platform must be smaller than the belt aperture (or space between two separate belts) so as to freely pass therethrough when the container is lifted to the sealing area.

FILM ADVANCING MECHANISM

Referring specifically to Figs. 3 and 4, and also generally to Fig. 1, as mentioned above cam 19a on shaft 19d, actuated by bevel gear-drive 19c, operates rod 19 and ratchet 20 and, with the assistance of pick-up grippers, clamps, fingers, or suction cups 30, advances film strip 10 beyond severing means 31 housed in enclosure 32 (Fig. 1). The severing means may be any conventional means, such as, a knife, guillotine, heated wire, etc. Alternatively, as shown in Fig. 7, a perforated film strip 10, and a reciprocating clamp 33, for example, may be used to restrain the strip, so that the tension caused by the grippers will cause the strip to separate into suitable sized cover pieces or blanks.

Several types of positioning mechanisms may be employed, but I prefer a conventional double, superimposed, oppositely operating rack and pinion arrangement (not shown) which would be operated by cam 6b and bell crank 34 connected thereto. One of the racks, for example, could move the pick-up grippers

or suction cups in a forward direction, while the other rack, preferably operated by the same pinion or gear, would be returning its fingers to their rear position.

For example, grippers or clamps 30 will pick up the end of the continuous film 10 and pull the entire film strip from the roll a sufficient distance, i.e., from point 30a to point 30b (see Figs. 3 and 4). Cutting means 31 then will sever the strip. At approximately the time grippers 30 are releasing the cut blank, grippers 35 will grab the blank. While grippers 30 are returning to their home position at 30a, grippers 35 will return, with the film blank, from position 35a to its home position 35b.

If desired, a modified arrangement could be used. Grippers 30 could be dispensed with and the sealing station moved closer to the cutting means 31. The cycle would be as follows: Gripping or clamping fingers 35 would grab the film strip at the severing point and would pull it out the necessary distance to form a film blank or film section and at the same time place it over the container to be covered. The cutter would then sever the strip, and grips 35 would return again to the severing point to pull out more film strip. Clearly, two or more sets of grippers could be used so that as one set was pulling the strip toward the covering and sealing area, the other set would be returning to the cutting area to grab the strip immediately after being cut and the sealing operation moved the previous section away.

HEATING, FORMING AND SEALING MEANS

After the cut film is positioned above the container, elevator shaft 21 and platform 22, actuated by cam 6 and cam fork 21a will rise through the apertures in shelf 13 and belt 15 to pick up and raise container 16, and subsequently film piece 10.

A circular heating ring 40, supplied preferably with fluid heat, such as hot air or steam, is preferably fixedly mounted on the housing 1 by supports 41.

A crosshead 42, attached to reciprocating rods 43 and cam fork 43a carries, from a depending central rod 44a, a shield 44 of insulating material, such as, asbestos, hard rubber, etc. As the container is raised by platform 22, it picks up a section of plastic film. In the meantime the shield 44, timed by cam 6c, descends past the heating ring (which preferably would be temporarily inoperative) to engage the rising container. Thus the container and film travel up to the end of the stroke, being positioned within the heating ring. Disc 44 shields the central area of the film while leaving the edges of the film exposed to blasts of hot air or steam or to heat caused by high frequency electricity, electrical resistance, infra red heat, or other heat supplied to the ring or directly to the film in conventional manner.

After the skirt edge of the cover has been momentarily exposed to the heat from any source and shrunk onto the container, the shield 44 may be raised and as the top of the covered container is lowered to be level with the heated blast, the central area of the film then will be shrunk so as to make a tighter and hence better seal. The sealed container is then lowered to the container belt and is advanced by the container belt, to be

and storing area.

For simplicity and ease of illustration, my device has been illustrated with a single sealing unit, i.e., sealing one container at a time. However, it is readily apparent that a series of these individual sealing units can be set up side by side, all within a single housing 1, and all operated from the same power shaft 5. The only limiting factor would be how wide the machine could reasonably be constructed, and this could conceivably seal 1 to 50 or more containers at one time.

Obviously, an oven heated by infrared heat lamps or any other heat would be within the spirit of my invention. The sole consideration is that a shield tightly pressed against the container rim must be provided before the film-covered container enters the heated area so that the skirt of the film will be selectively shrunk first to provide a tight, but elastic and flexible, edge bead around the container and removably retain the cover on the container. If the shield is not pressed tightly against the container rim, to thereby shield and restrain the entire area within the mouth of the container when the film edges are being heated, no seal will result. Hence, insulating shielding element 44, which may be flat or with short depending sides, functions as a clamp as well as a shield, and may be properly referred to as a restraining or retaining shield or restraining plate. If desired, obviously, only the skirt need be exposed to heat and shrunk. In this case, the central area will not be as tight as if it too were exposed directly to heat.

Registered trademarks mentioned on page 3 above:
1. "Pliofilm" of Goodyear Tire & Rubber Co.
2. "Snug-Pak" of Tee-Pak, Inc.
3. "Saran" Wrap of Dow Chemical Co.
4. "Cryovac" of W.R. Grace & Co.
5. "Mylar" of E.I. duPont & Co.

The claims defining the invention are as follows:

1. An apparatus for simultaneously forming a cover and sealing a filled container by shrinking the peripheral area of a heat shrinkable film comprising a film supply means, container conveying means, severing means to cut the film into sections, film conveying means to position a section of film over a container, means for applying heat to the peripheral area of the positioned film, and means to shield only the interior area of the film while heat is applied to the peripheral area.

18 SEP 1967

2. An apparatus as set forth in claim 1 for a thin plastic, heat shrinkable film forming a cover by selectively shrinking the peripheral area of the film and subsequently shrinking the interior area, said film supply means comprising storage means to store and dispense film, said severing means to separate a continuous film strip into sections being located adjacent said storage means, said means to position a section of film over the container also withdrawing film from said storage means to be cut by said severing means, and elevating mechanism to raise a container from the container conveying means and to obtain a section of film positioned by said film positioning means before contacting the shielding means, and subsequently entering the heating means. 18 SEP 1967

3. An apparatus for performing selective shrinkage to form a closure and simultaneously seal a filled container using heat shrinkable, oriented plastic film comprising means for feeding heat shrinkable, oriented plastic film from a source therefor to a cut-off station, cut-off means for cutting said film at predetermined intervals, transfer means to move the cut off film to a sealing station, container transfer means to move

a filled container to the sealing station, elevating means for elevating container and film at the sealing station, film restraining means for restraining and shielding said film on top of said container, heating means for selectively shrinking the edge of said film while being restrained by shielding means to thereby make a tight seal. 18 SEP 1967

4. An apparatus as set forth in claim 3 wherein after the edge of the film is shrunk onto the container, means are provided to move the restraining shield relative to the film and container whereby the formerly protected film on the top of the container then will be exposed to heating means and this latter area will be shrunk to make the edge seal tighter.

18 SEP 1967

5. An apparatus as set forth in claim 4 wherein said container transfer means comprises a stationary shelf having an aperture slightly smaller than the bottom of the container, said aperture positioned directly over said elevating means, and belt means having apertures throughout its length and of approximately the same size as the aperture in said shelf whereby the container will not pass through either of the apertures, while permitting the elevating means to pass therethrough and lift the container and subsequently the film into the heating and sealing zone. 18 SEP 1967

6. An apparatus for simultaneously making closures and sealing containers comprising a container transfer conveyor and a heat shrinkable, oriented plastic film transfer conveyor, said film conveyor being arranged above the container conveyor, an elevating mechanism normally positioned beneath the container and adapted to rise carrying the container and the film to the heating means, and a shielding member over the central area of the film while adjacent the heating means whereby the central area of the film will be protected from the heat as long as the shield is positioned over the central area of the film

7. An apparatus as set forth in claim 6 wherein means are provided to remove said shielding member just prior to the removal of the container from the heating zone.

18 SEP 1967

8. An apparatus as set forth in claim 7 wherein the container conveyor comprises a stationary shelf and a movable belt means, said shelf having an opening therein, and said belt means having at least one cooperating space therein, both said opening and said space being smaller than the bottom of the container but large enough to permit the passage of said elevating mechanism through the shelf and the belt means whereby to raise the container therefrom into the heating means.

18 SEP 1967

9. An apparatus as set forth in claim 8 wherein the film conveyor mechanism comprises a shelf having an aperture therein cooperating with the opening in said container shelf whereby a section of film positioned thereover will be picked up by the rising container.

18 SEP 1967

10. An apparatus as set forth in claim 9 and a severing means, said film conveying mechanism comprising two sets of fasteners normally at opposite ends of said shelf, one set of fasteners adapted to move the film from storage means beyond a severing means, said severing means adjacent said storage means for cutting the film strip into sections, and a second set of fasteners to drag the film strip and to position it over the container while the first set of fasteners returns to its initial position adjacent the severing means.

18 SEP 1967

11. An apparatus as set forth in claim 10 wherein the container conveyor mechanism comprises a series of cams, levers, and a ratchet arrangement whereby to provide a step-wise interrupted motion to said containers, and a cam, a crank and a ratchet arrangement connected to and operating through said film storage means to provide an interrupted, step-wise advance for the film.

18 SEP 1967

12. An apparatus as set forth in claim 11, and a power shaft, a series of cams mounted on said shaft, and said elevating mechanism comprising a rod at one end operatively connected to one of said cams, a platform of irregular shape, its length being longer than the bottom of the container to be raised and its width being shorter than the container to be raised so that it will pass through the opening in the shelf and belt means, being attached to the other end of said rod, and a stationary bearing intermediate the ends of said rod, said power means operatively connected to both the container conveying mechanism and the film conveying mechanism.

18 SEP 1967

13. A method for simultaneously making a closure and sealing a container comprising the steps of providing a heat shrinkable, oriented thin plastic film, moving said plastic film to a severing area, cutting the film strip into film sections, moving the film sections and superimposing the film sections over a filled container to be covered, shielding the central area of said plastic cover, and applying heat to the circumferential area of the film whereby to hermetically seal the container. 18 SEP 1967

14. The method as set forth in claim 13 wherein an interrupted, step-wise movement is imparted to the film to move it to the sealing area, and an interrupted, step-wise movement is imparted to the container in moving it to the sealing area. 18 SEP 1967

15. The method as set forth in claim 14 plus the step of raising the container and superimposed film to engage a shielding element, and subsequently raising said container and film to enter a heating area.

16. The method as set forth in claim 15, plus the additional step of positioning the container on spaced apart dual belt means on an apertured shelf, and moving a platform through the aperture in the shelf and the space between the dual belts to raise the container, the film, and the shield into the heating area, subsequently, after the peripheral area of the film has been shrunk tightly against the rim of the container, lowering only the container while keeping the shield at the same level, whereby to permit the heat to impinge upon the central area of the plastic film to shrink this central area and make a tighter seal at the rim of the container. 18 SEP 1967

17. A method of forming a cover upon a filled container and simultaneously sealing a container comprising the steps of cutting a piece of predetermined size from a web of limp, thin, fragile, transparent, flexible, unformed, heat shrinkable, oriented plastic film, placing said piece on top of a container to be sealed, said piece being substantially larger than the mouth of the container and extending beyond said mouth circumferentially, retaining said piece in position across the mouth of the container, shielding the portion of the film encompassed by the perimeter of the mouth of the container, and applying heat to said film whereby to obtain selective, and edge only, shrinkage of the film thereby forming a cover and simultaneously sealing the container.

18 SEP 1967

18. An apparatus for simultaneously forming a cover and sealing a filled container substantially as hereinbefore described with reference to and as illustrated by the accompanying drawings. (18th September, 1967)

19. A method for simultaneously making a closure and sealing a container substantially as hereinbefore described with reference to and as illustrated by the accompanying drawings. (18th September, 1967)

DATED THIS 14TH DAY OF SEPTEMBER, 1967

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30 Russell Street,
Melbourne, Victoria,
Australia.

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FIG. 1.

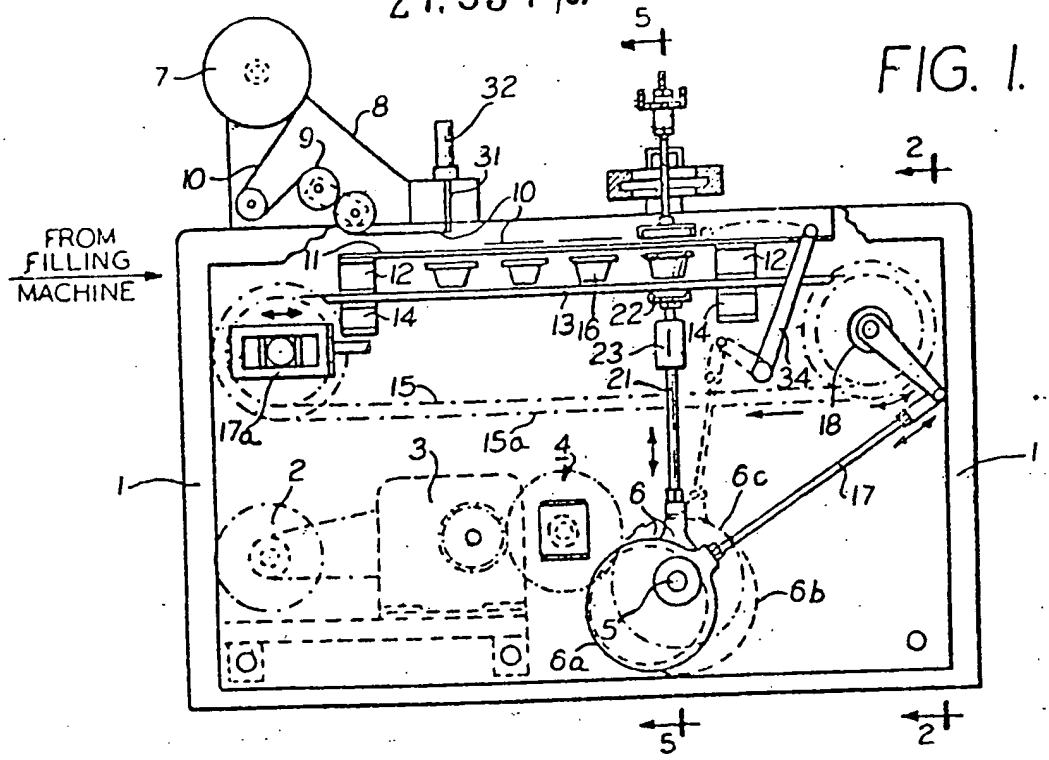


FIG. 2.

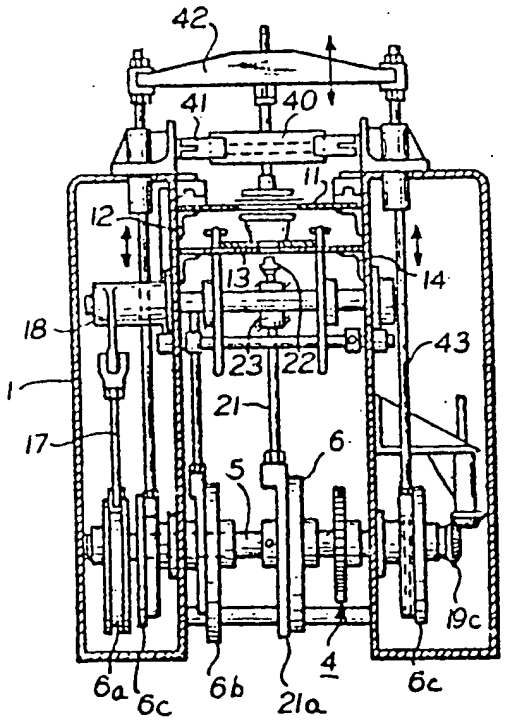


FIG. 5.

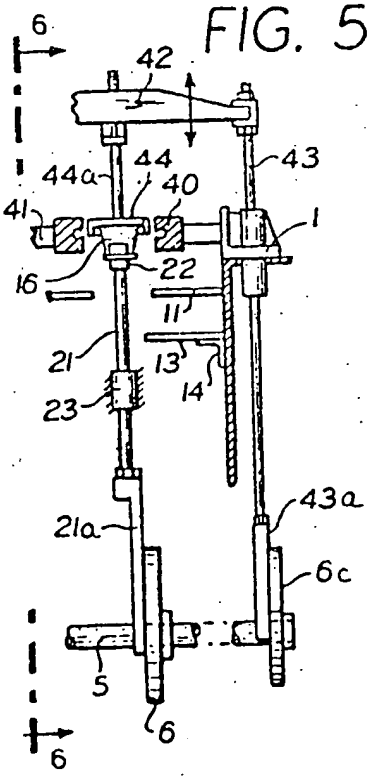


FIG. 3.

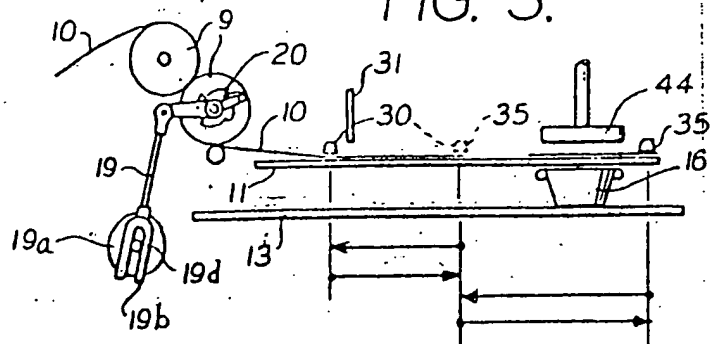


FIG. 4.

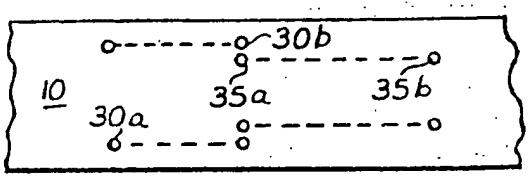


FIG. 6.

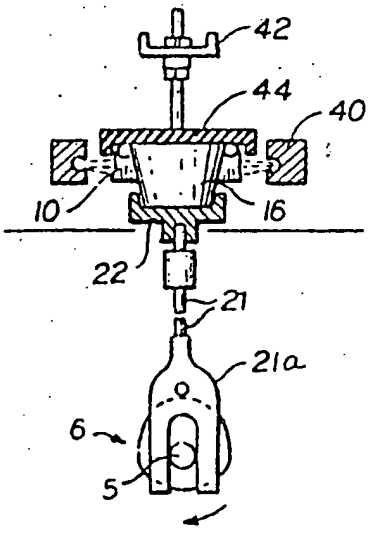
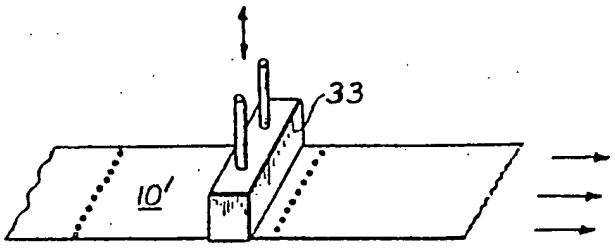


FIG. 7.



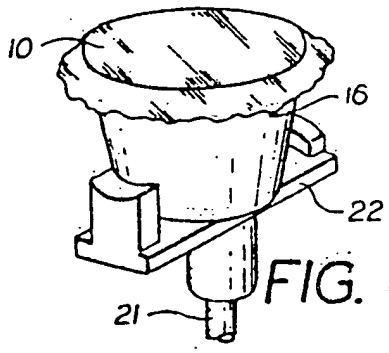


FIG. 6A.

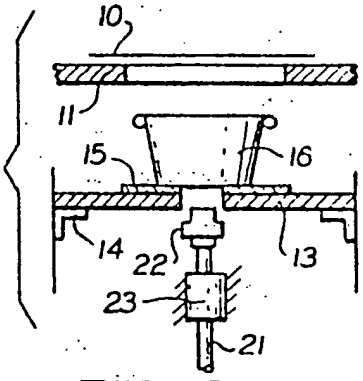


FIG. 2A.